

A new locality for the threatened Green-thighed Frog *Litoria brevipalmata* in coastal north-east New South Wales

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ABSTRACT

The Green-thighed Frog *Litoria brevipalmata* is known from scattered localities in north-east New South Wales and southern Queensland. A new record from Bundjalung National Park in New South Wales is documented, and its contribution to the understanding of the ecology of the species is discussed.

Key words: *Litoria brevipalmata*, Bundjalung National Park, Coastal habitat, Open forest/dry heath.

INTRODUCTION

The Green-thighed Frog *Litoria brevipalmata* is known from scattered localities from Ourimbah on the New South Wales Central Coast (Mahony 1993) to as far north as Cordalba, south-west of Bundaberg, in south-east Queensland (H. Hines, Queensland Department of Environment and Heritage, pers. comm.). *Litoria brevipalmata* is listed as vulnerable in the New South Wales *Threatened Species Conservation Act 1995* and as rare in the Queensland *Nature Conservation Wildlife Regulation 1994*. Tyler (1992) listed the species as sparse and vulnerable.

L. brevipalmata was not described until 1972 (Tyler *et al.* 1972) and has been referred to as an enigmatic (Mahony 1993), mysterious (Natrass and Ingram 1993) and little known (Cogger 1996) species. Only six populations were known in Queensland in 1995 (Stewart 1995) and 16 in New South Wales in 1996 (Lemckert *et al.* 1997). The species is typically recorded only during brief breeding episodes, which apparently only occur during and immediately following heavy spring and summer rains and resultant flooding of ephemeral ponds (Czechura 1978; Natrass and Ingram 1993; Mahony 1993; Ehmann 1997).

Barker *et al.* (1995) noted that the distribution and habitat preferences of *L. brevipalmata* remained poorly known. Descriptions of habitat range from rainforest and wet sclerophyll forest (Robinson 1991; Cogger 1996; Ehmann 1997) to swamp sclerophyll forest (Wellington and Wells 1995; Lemckert *et al.* 1997), dry open forest (McDonald 1974; Czechura 1978; Natrass and Ingram 1993; Cavanaugh 1996) and wet heath/shrubland (Stewart 1995). This paper documents the discovery of *L. brevipalmata* at a coastal site in north-east New South Wales and provides a description of its habitat at this locality.

OBSERVATION AND LOCALITY DETAILS

A single adult male *L. brevipalmata* was captured crossing a vehicular service trail in the southern part of Bundjalung National Park, in coastal north-east New South Wales, at about 11.30 pm on 26 February, 1997. At the time of the sighting the weather was fine with no wind although humidity was relatively high. Heavy rain and thunderstorms started at 12.30 am that night and continued the next day, resulting in the filling of previously dry ephemeral water bodies in the general area.

The animal was taken for inclusion in a study of the genetic diversity within the species (Donnellan *et al.* 1997); the results of which suggested that all *L. brevipalmata* populations within New South Wales comprised a single Evolutionarily Significant Unit. The specimen was subsequently lodged in the Australian Museum (AM specimen R153953) and a liver tissue sample (tissue No. M110) lodged in the Frozen Tissue Store in the South Australian Museum.

The site where the frog was captured (29°20'S, 153°18'E) (Figs 1 and 2) is located four kilometres from the coast at an elevation of less than 10 m AHD. Additional species of frog recorded in the local area are listed in Table 1.

Vegetation at the site comprised the northern edge of an ecotonal community containing elements of open forest to the south on clay loam soils and open shrubland with a heathy understorey on a sand substratum to the north. The change in vegetation coincided with a drop of about 0.5 m in surface level to a drainage line with a small intermittent watercourse. This drainage line was dry at the time the observations were made; however, the presence of rushes, sedges and emergent *Melaleuca quinquenervia*

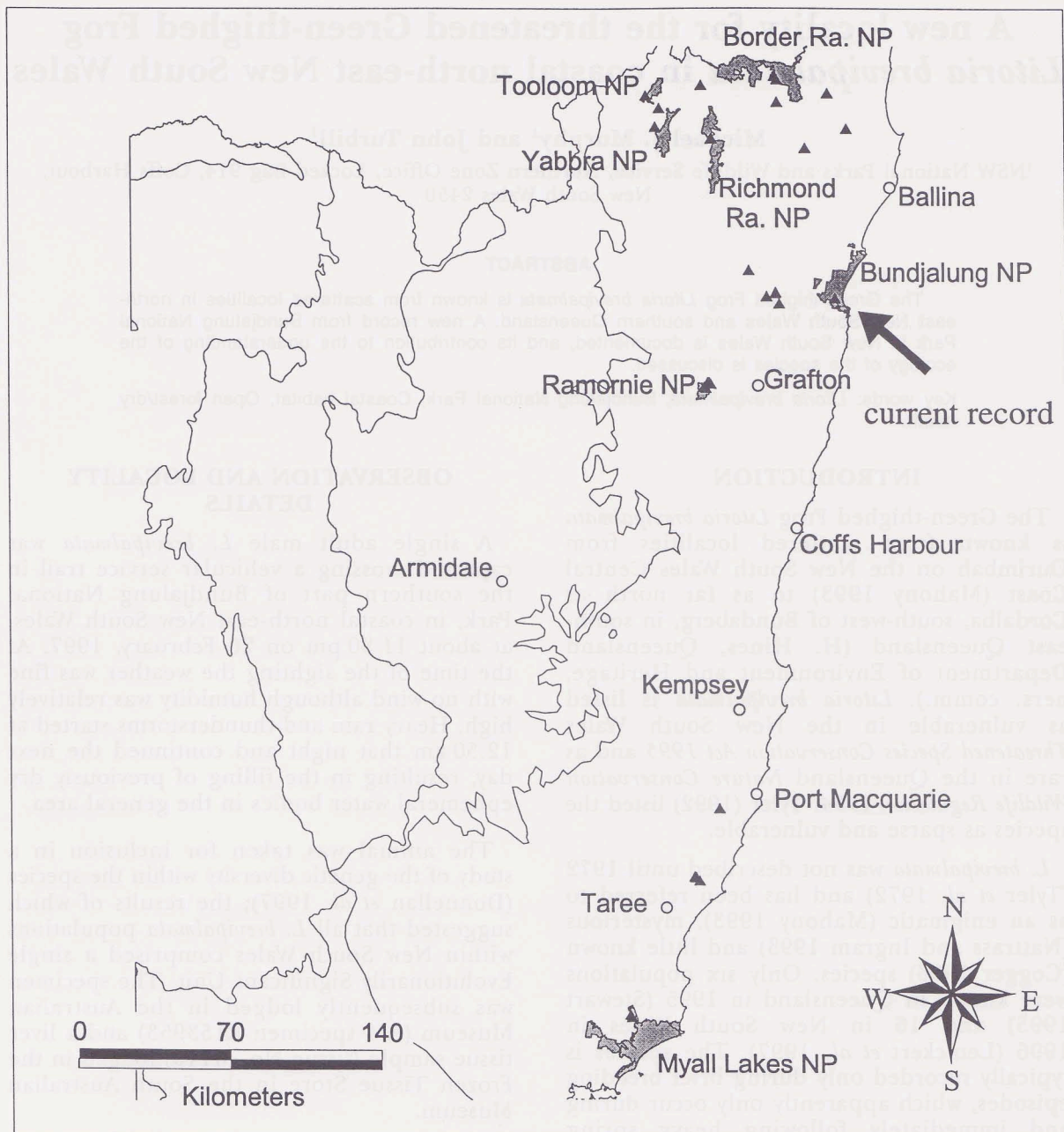


Figure 1. Records of *Litoria brevipalmata* in north-east New South Wales. Source: NSW National Parks and Wildlife Service Atlas of New South Wales Wildlife. Shaded areas represent national parks with known populations. Lines represent biogeographic regional boundaries.

indicated areas of impeded drainage where water would be retained after rain.

The open forest to the immediate south was dominated by *Eucalyptus pilularis* with *E. microcorys* and an unidentified Ironbark *Eucalyptus* sp. also present. The understorey was thickly vegetated in most areas with *Dodonaea triquetra*, *Rhodomyrtus psidioides* and *Acacia* species. *Imperata cylindrica*, *Pteridium esculentum* and *Themeda australis* made up the ground cover.

The open shrubland comprised regenerating emergent *M. quinquenervia*, *Lophostemon*

suaveolens and *Acacia* spp. to a height of 8 to 10 m over a regrowth of heath species such as *Leptospermum poligalifolium*, *Pultenaea myrtoides*, *Persoonia stradbrokeensis*, *Persoonia virgata*, *Styphelia viridis* spp. *berviflora*, *Aotus lanigera*, *Baeckea stenophylla*, *Acacia maidenii*, *A. ulicifolia*, *Banksia ericifolia*, *B. integrifolia* and *Viminaria juncea*. *Cassytha filiformis* was present as a dense cover over many understorey plants. *Restio tetraphyllus*, *Gahnia* sp., *Lomandra longifolia* and other rushes were present in areas of impeded drainage. In the ecotonal area taller *M. quinquenervia*, *Acacia aulacocarpa* and *Glochidion ferdinandi* were present.

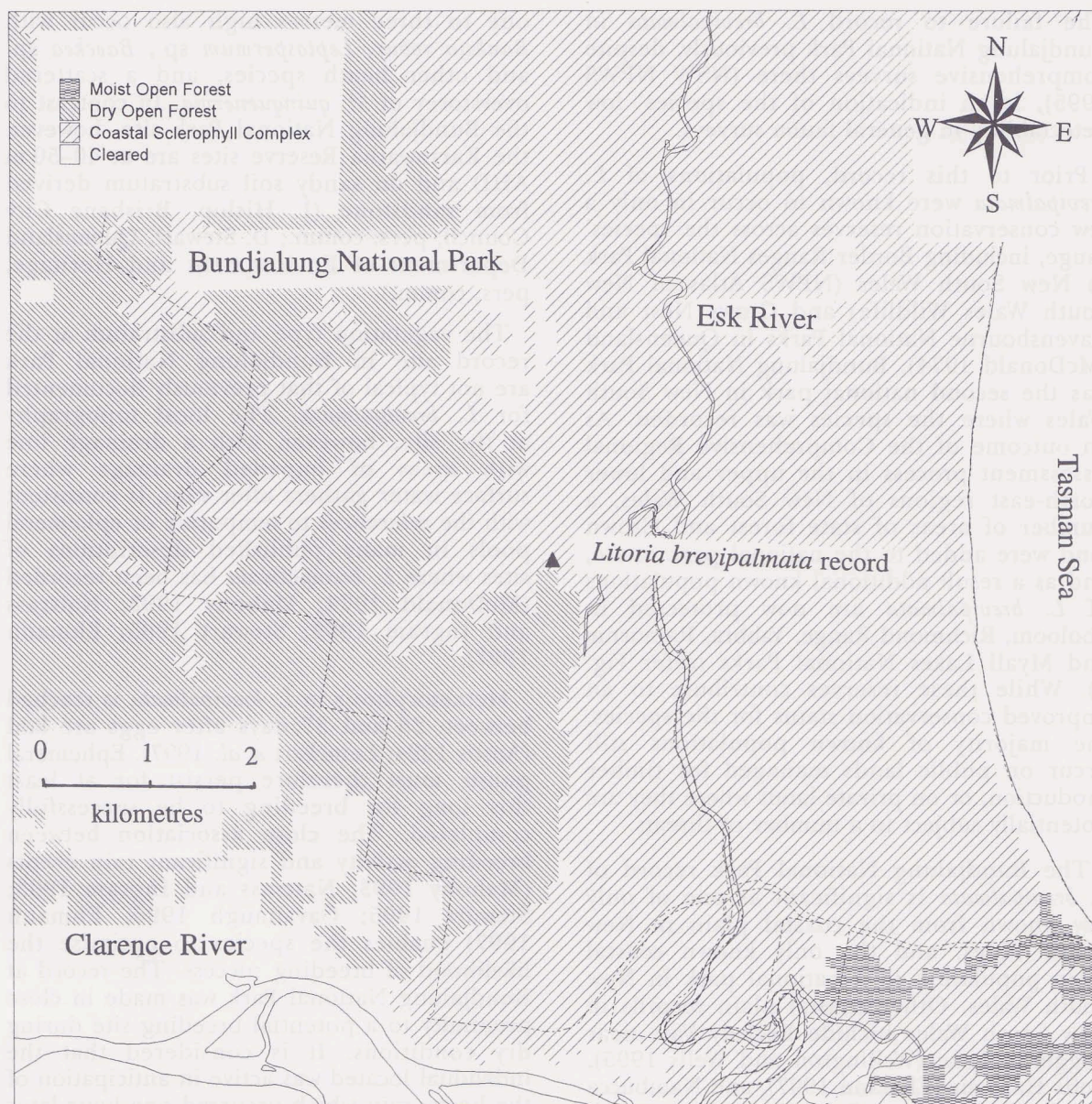


Figure 2. Broad vegetation communities in proximity to record of *Litoria brevipalmata* in Bundjalung National Park, New South Wales. The record site was located in an ecotone area between dry open forest and coastal shrubland/heath.

Table 1. Frog Species Recorded in the Local Area in Bundjalung National Park, New South Wales.

Hylidae
<i>Litoria brevipalmata</i> Green-thighed Frog ₁
<i>Litoria dentata</i> Bleating Tree Frog ₁
<i>Litoria freycineti</i> Freycinet's Frog ₁
<i>Litoria gracilentia</i> Dainty Green Tree Frog ₁
Myobatrachidae
<i>Crinia signifera</i> Common Froglet ₁
<i>Crinia tinnula</i> Wallum Froglet ₂
<i>Limnodynastes peronii</i> Striped Marsh Frog ₁
<i>Limnodynastes terraereginae</i> Northern Banjo Frog ₁
<i>Pseudophryne coriacea</i> Red-backed Toadlet ₁
<i>Uperoleia</i> sp. Toadlet species ₁

₁ recorded by the authors as active in the area 26–27 February, 1997.

₂ record from NSW National Parks and Wildlife Service Atlas of New South Wales Wildlife.

Vegetation at the site showed signs of a wild-fire which burnt through the area in 1991–92 and a wildfire control burn in 1993–94. No areas of permanent water were observed at the site. Vegetation in the wider area around the site comprised open forest and coastal heathland/shrubland communities (Fig. 2). No areas of moist forest or rainforest occurred in proximity.

DISCUSSION

This record of *L. brevipalmata* in Bundjalung National Park represents a previously unknown population of the species. The closest documented record is at Whiporie (29°18'S, 153°11'E) 27 km west (Cavanaugh 1996).

The failure to record *L. brevipalmata* in Bundjalung National Park previously, despite comprehensive surveys there (NSW NPWS 1995), is an indication of the species' low detectability in general fauna surveys.

Prior to this record, populations of *L. brevipalmata* were known to occur in only a few conservation reserves across the species' range, including Border Ranges National Park in New South Wales (NPWS Atlas of New South Wales Wildlife) and Crows Nest and Ravensbourne National Parks in Queensland (McDonald 1974). Bundjalung National Park was the second national park in New South Wales where the species was recorded. As an outcome of the Comprehensive Regional Assessment process in the upper and lower north-east regions of New South Wales, a number of areas of state forest and Crown land were added to the national park estate, and as a result additional known populations of *L. brevipalmata* are now protected in Tooloom, Richmond Range, Yabba, Ramornie and Myall Lakes National Parks (refer Fig. 1). While these reserves contribute to an improved conservation status for the species, the majority of known populations still occur on public lands managed for timber production, or on private lands where they are potentially subject to a number of threats.

The Bundjalung National Park record of *L. brevipalmata* is significant as one of only few known from the coastal plain in New South Wales, and the only known coastal plain population in a national park in New South Wales. Other coastal plain records in New South Wales include Berkely Vale near Tuggerah Lake (Wellington and Wells 1995), Coffs Harbour (Ehmann 1997), and Nambucca Heads (F. Lemckert, State Forest New South Wales, pers. comm.), the latter record being a breeding record in pools on a sandy substratum (F. Lemckert, pers. comm.). The accuracy of the cited location of the Coffs Harbour record has been questioned by Austeco (1998).

L. brevipalmata has previously been recorded from a wide range of vegetation types (McDonald 1974; Robinson 1991; Nattrass and Ingram 1993; Wellington and Wells 1995; Ehmann 1997; Lemckert *et al.* 1997). The habitat characteristics of the Bundjalung National Park site would appear to most closely correspond to sites where the species has been recorded in Karrawatha Reserve in Queensland, a 950 ha bushland reserve managed by Brisbane City Council. Vegetation in Karrawatha Reserve comprises mostly eucalypt woodland with a grassy understorey on sandy soil. Areas of wet heath/shrubland

one to three metres high also occur with *Banksia robur*, *Leptospermum* sp., *Baeckea* sp. and other heath species, and a scattered overstorey of *M. quinquenervia*. In contrast to the Bundjalung National Park site, however, the Karrawatha Reserve sites are at 40–50 m AHD and on sandy soil substratum derived from sandstone (I. Hislop, Brisbane City Council, pers. comm.; D. Stewart, Queensland Department of Environment and Heritage, pers. comm.).

The vegetation type and substratum at the record site in Bundjalung National Park are not typical of that previously documented for *L. brevipalmata*. The local topography at the site, however, with a drainage line with areas of impeded drainage where surface water gathers after rain, is consistent with the references to temporary or ephemeral pools in many published descriptions of sites where *L. brevipalmata* has been recorded (McDonald 1974; Mahony 1993; Nattrass and Ingram 1993; Stewart 1995; Ehmann 1997).

Metamorphosis in *L. brevipalmata* is reached between 28 and 57 days after eggs are laid (Anstis 1994; Lemckert *et al.* 1997). Ephemeral ponds must therefore persist for at least this long for breeding to be successfully completed. The close association between breeding activity and significant rain events (Mahony 1993; Nattrass and Ingram 1993; Stewart 1995; Cavanaugh 1996; Ehmann 1997) enables the species to optimise the likelihood of breeding success. The record at Bundjalung National Park was made in close proximity to a potential breeding site during dry conditions. It is considered that the individual located was active in anticipation of the heavy rain which occurred one hour later that night.

CONCLUSION

The site details of this new record support the proposition that local scale topography where suitable breeding sites are available is at present a better predictor of the likely occurrence of *L. brevipalmata* than is broad vegetation or soil type. Further research is needed to fully determine the attributes of the species' habitat requirements. Until further information is known a precautionary approach is recommended in determining presence/absence for this species, giving particular attention to the occurrence of suitable local topography and taking note of the broad range of vegetation types in which the species has been recorded. In such areas targeted surveys under optimal seasonal and weather conditions are necessary.

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